

NOTES ON SOME REPRESENTATIVES OF THE ASTEROID
GENUS *CULCITA*.

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The purpose of this contribution is to add to our knowledge of the representatives of the complex genus *Culcita* so as to lighten, in some degree, the task of future workers when endeavouring to formulate a better and more comprehensible classification.

Much has already been written on the genus, but continued effort seems essential before the vast array of variation can be subjected to a classification.

Fisher's (1) remarks that *C. novaeguineae* "appears to be in a state of flux" seems to be very true, but his belief that "every new specimen of *Culcita* seems to augment rather than relieve the difficulties relative to the species problem" does not hold good in most cases if the specimens before me are any criterion. For the most part, the present series of specimens supports the views expressed by Döderlein (2) and later followed by Goto (3).

The specimens herein dealt with are housed in the Australian Museum, Sydney.

CULCITA NOVAEGUINEAE VAR. *TYPICA*.

Culcita novaeguineae Müller and Troschel, Syst. der Asteriden, 1842, 38.

Culcita novae-guineae var. *typica* Döderlein (in Semon) Zool. Forschungsgr. in Austr. und dem Malay Archip., v. (Jena Denkschr., viii.), 1896, 315, pl. xix., figs. 3, 3a.

Culcita novae-guineae var. *typica* Goto, Journ. Coll. Sci., Tokyo, xxix., Art. I., 1914, 517.

Culcita novaeguineae Forma *novaeguineae* Fisher, Bernice P. Bishop Museum, Bull., xxvii., 1925, 70.

(Pl. xv., fig. 3; pl. xvi., fig. 6; pl. xvii., fig. 4.)

Two specimens, considered referable to the typical form, are before me. One is labelled "South Seas" and has much in common with Döderlein's figures. It fits exactly into the var. *typica* section of Goto's key. In a dry condition R. = 116 mm. The body is pentagonal, swollen and ridged interradially, with a slight bulge interradially near the margin as shown in Döderlein's Fig. 3a.

The non-poriferous areas on the abactinal surface of the specimen are practically as shown in Fig. 3, and the contained spinelets are also similar in both size and distribution. The spinelets on the poriferous or papular areas do not appear to be so numerous, or of such an even size, as depicted in Döderlein's Fig. 3. On the whole they are a little larger, apparently approaching closer to Fisher's (*loc. cit.*) specimen from Johnston Island, but not so closely to Döderlein's Fig. 7 on pl. xix., as Fisher thought was possible

(1) Fisher, Bernice P. Bishop Museum, Bull., xxvii., 1925, 70.

(2) Döderlein (in Semon) Zool. Forschungsgr. in Austr. und dem Malay Archip. (Jena Denkschr., viii.), v., 1896, 315, etc.

(3) Goto, Journ. Coll. Sci. Tokyo, xxix., Art. I., 1914, 515 onward.

with his specimen. The spinelets on the non-poriferous areas are generally greater in size than those on the poriferous areas. As in Fisher's Johnston Island specimen, the whole abactinal surface is covered by a fine, close, and distinctly conical granulation, from which arise conical spinelets and numerous upright two-jawed pedicellariæ.

The pedicellariæ are similar to those described by Fisher, being "higher than wide, with the broadened, rounded tops bent tongs-like toward one another." They are fairly abundant and rise most definitely above the general granulation, but they are not as high as any of the surrounding spinelets.

The actinal surface is the same as in Döderlein's Fig. 3a, except that the present specimen does not possess the evenly radiating furrows so clearly shown in that figure; the furrows, where present, are uneven and irregular. It seems reasonably certain that this character is governed by the methods of drying and the amount of shrinkage undergone in the process.

The second specimen of the typical form was collected in the New Hebrides near where the type of *acutispinosa* was secured. It has, however, characters which at once separate it from that variety. The specimen conforms to the requirements of the typical form, as set out in Goto's key, and agrees with Döderlein's Fig. 3 in all important points. The variation to be seen on the abactinal surface is confined to the number of spinelets present. There are fewer spinelets present on this example than shown in Fig. 3, and even less than in the first example described above. The conical spinelets carried on the non-poriferous areas appear to be present in almost normal numbers, the paucity of the spinelets being most apparent on the poriferous areas. Actinally, this specimen from the New Hebrides has the radiating furrows developed a little better and more regularly than in the first specimen, and almost as well as those shown in Döderlein's Fig. 3a.

Localities.—"South Seas" (Austr. Mus., Reg. No. G. 7741); Southwest Bay, Malekula, New Hebrides (Austr. Mus., Reg. No. J. 3170).

Distribution.—Amboina to Samoa.

CULCITA NOVAEGUINEAE VAR. *ACUTISPINOSA*.

Culcita acutispinosa Bell, Ann. Mag. Nat. Hist. (5), xii., 1883, 344.

Culcita novae-guineae var. *acutispinosa* Döderlein (in Semon) Zool. Forschungsgr. in Austr. und dem Malay Archip., v. (Jena Denkschr., viii.), 1896, 315, pl. xx., figs. 8, 8a.

? *Culcita acutispina* Whitelegge, Mem. Austr. Mus., iii., 1897, 157.

Culcita novae-guineae var. *acutispinosa* Goto, Journ. Coll. Sci. Tokyo, xxix., Art. I., 1914, 517.

Culcita novaeguineae forma *acutispinosa* Fisher, Bernice P. Bishop Museum, Bull., 27, 1925, 71.

(Pl. xiv., fig. 5; pl. xvi., fig. 3; pl. xvii., fig. 5.)

Only when additional records and figures are published will one be able to obtain some idea as to the extent of the irregularities of this variety. To-day we know very little about it, and even Bell's description gives but scanty information. The variety is at present recognised by the continuous papular areas and the smallness and irregularity of the scattered non-poriferous areas; also by the presence of numerous coarse spinelets uniformly distributed, or nearly so, over the entire abactinal surface.

It must be admitted that this diagnosis is very elastic and can be made to meet a number of types all different in some degree. As a proof of this

one need only look at the records of the variety to date. However, it would seem at present, as we have no information available to point to the contrary, that all the types so far assembled under the varietal heading (with the possible exception of Whitelegge's record) are referable to the one form, and that obvious differences are due to age and shrinkage during the process of drying.

Döderlein's photographs were obviously prepared from young specimens, hence the differences seen when they are compared with mature examples.

Whitelegge's record of the variety, which he recorded as a full species, is queried in the above synonymy for the reason that his description seems to apply to the typical form or to the var. *plana* rather than the variety *acutispinosa*. A re-examination of Whitelegge's material is impossible as the two specimens have been lost.

The specimen before me was collected in the Solomon Islands, and, although it does not fit exactly into any available description, or compare favourably with either of Döderlein's figures, it possesses many points in common with Fisher's specimen from Agana, Guam.

The body is pentagonal with the "rays" slightly produced. R. = about 84 mm. in a dried condition. The sides are steep, almost upright, and the abactinal surface is slightly convex. The papular areas merge, there being only isolated and irregularly disposed non-poriferous patches. The abactinal granulation, so evident in the typical form, is much less in extent on the present variety, and is confined, for the most part, to the non-poriferous areas.

The entire abactinal surface is covered by a large number of sharp, stout, conical spinelets, a few as large as, but most larger than, the biggest occurring on the typical form. Generally these large spines are 1.75 mm. in height, and as much across the base, including the granulation, which extends up the spinelets for a short distance. In certain places near the margins the spines are arranged in lines, giving the surface a reticulated appearance. In no respect is the reticulation the same in character as in other varieties. Again, no such formation is seen anywhere but near the margins. As in Fisher's specimen, the pedicellariæ are smaller and narrower than those of the typical form. The pedicellariæ are extremely abundant, so much so that they appear to take the place of the usual granulation.

Actually the specimen fits the description given by Fisher for his specimen from Guam so perfectly that nothing more need be added.

Locality.—Government Station, Tunabuli Harbour, Ysabel Island, British Solomon Islands, July, 1925 (Austr. Mus., Regd. No. J. 4732).

Distribution.—New Hebrides; Viti Islands; Guam; Ysabel Island, British Solomon Islands; ? Funafuti, Ellice Islands.

CULCITA NOVAE-GUINEAE VAR. TYPICA-ACUTISPINOSA.

Culcita novae-guineae var. *typica-acutispinosa* Döderlein (in Semon) Zool. Forschungsr. in Austr. und dem Malay Archip., v. (Jena Denkschr., viii.), 1896, pl. xx., fig. 7.

(Pl. xv., fig. 2; pl. xvi., fig. 2; pl. xvii., fig. 1.)

This *Culcita* was collected at Southwest Bay, Malekula, New Hebrides, along with one described above, under the heading of the typical form. It agrees with no known member of the genus better than with the one figured

by Döderlein in the reference above, and, judging by its peculiarities, appears to represent a phase between the typical form and the var. *acutispinosa*.

The abactinal spinulation is, for the most part, the same as in the var. *typica*, except that it is a little denser. It has, however, the continuous papular areas so characteristic of the var. *acutispinosa*.

The fact that the specimen was collected in the New Hebrides, and that it may be Bell's *acutispinosa*, has not been overlooked. With so little information available the question is difficult to decide, and for the present I have arrived at a judgment founded upon Döderlein's work. If the present specimen is ultimately found to be Bell's variety some change will have to be made in regard to the specimen mentioned elsewhere in this paper as var. *acutispinosa*.

The specimen has been figured in order to show a comparison between it and its two extremes, var. *typica* and var. *acutispinosa* as here understood. R. = 90 mm. approximately.

Locality.—Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3196).

Distribution.—South Sea (Döderlein); New Hebrides.

CULCITA NOVAEGUINEAE VAR. *PLANA*.

Culcita plana Hartlaub, Notes Leyden Museum, xiv., 1892, 84.

Culcita plana Leopoldt, Zeitschr. Wiss. Zool., lix., 1895, 637, pl. xxxii., figs. 10a-b.

Culcita novae-guineae var. *plana* Döderlein (in Semon), Zool. Forschungsr. in Austr. und dem Malay Archip., v. (Jena Denkschr., viii.), 1896, 315, pl. xix., figs. 1-1a; 2-2a; 4.

Culcita novae-guineae plana Fisher, U.S. Nat. Mus., Bull. 100, iii., 1919, 361.

(Pl. xiv., fig. 1; pl. xvi., fig. 4; pl. xvii., fig. 2.)

Four specimens before me are considered referable to this variety. Slight differences are noticeable, but on the whole the characters fall well within the varietal limits.

The first specimen (R. = approximately 92 mm.) bears a locality label "Great Barrier Reef, Queensland," and is identical with Döderlein's Figs. 1 and 1a on pl. xix. The papular areas are roughly circular and are entirely separated by well-defined non-poriferous patches. The non-poriferous patches are provided with a number of stout conical spinelets of large size, but here and there blunt or even flat ones are noticeable. The spinelets generally are not as large as those occurring on the var. *acutispinosa*.

The poriferous areas are armed with a few spinelets, the majority of which are smaller than those occurring on the non-poriferous patches. Poriferous areas near the margins carry a greater number of spinelets than the areas more central in position.

Pedicellariæ are fairly numerous. They are notably shorter and more heavily built than those of any variety of the species.

The second specimen of the var. *plana* before me was identified by Dr. H. L. Clark (4) as *Culcita novae-guineae* and recorded from the "Great Barrier Reef," Queensland. It is the largest of the four available specimens; R. = about 100 mm. as stated by Dr. Clark. Owing, no doubt, to its large dimensions the spinelets on the non-poriferous areas are of consider-

(4) Clark, H. L., Rec. Austr. Museum, xv., 2, 1926, 195.

able size, but not as abundant as in the first specimen described above. All the poriferous areas are separated by well-developed non-poriferous patches and carry conical spinelets of small size. Pedicellariæ are fairly abundant, and, although they are not so stout as those seen on the first specimen, they are not as slender as those on the other varieties of the species.

Actinally this specimen resembles the var. *acutispinosa* in that the tubercles gradually flatten from the mouth, where they are distinctly rounded, toward the margins. Near the margins the tubercles broaden to form a flat polygonal tessellation. Although flat and crowded, the tubercles do not in any place totally obscure the underlying coarse granulation.

A third specimen (R. = approximately 90 mm.) was collected at Ugi, Solomon Islands. It is closest to Döderlein's Fig. 4 on pl. xix. The non-poriferous areas, which effectively separate the poriferous areas, are, for the most part, devoid of the usual granulation, being bare and with the integument leathery and like ebony in appearance. This unusual condition of the specimen is no doubt brought about by its long sojourn in a collection and by wear through handling. In other features the abactinal surface corresponds to that of the first specimen, except that in the present specimen no pedicellariæ can be traced. Even in protected areas, where wear is not apparent, pedicellariæ are absent, and therefore it can be reasonably assumed that they were never present.

The tubercles of the actinal surface, although of average size for the variety, are sparse and consequently widely spaced. Owing to this condition the underlying granulation is very conspicuous. The tubercles exhibit no signs of flattening.

The fourth specimen, which was taken at Palm Island, Queensland, is no doubt referable to the var. *plana*, despite its somewhat variable appearance, due to the smallness of the abactinal spinelets and the flat smoothness of the papular areas. R. = approximately 96 mm. Abactinally it is closest to the first specimen, but there are differences to be seen when a comparison is made. The smallness of the spinelets is most noticeable, but, situated at random on the well-defined non-poriferous areas, are larger and more conical spinelets comparable in size with those occurring on the other specimens of the variety before me. Many of the small spinelets are blunt and rounded; some are flat and not at all conical in shape. The non-poriferous areas are covered by a dense granulation, and are responsible for the isolation of the papular areas. The papular areas contain a few small conical spinelets as a general rule, but there are some areas which are totally unarmed.

The singular smoothness of the papular areas in this fourth specimen is due to the lack of the usual number of minute conical spinelets, the absence of pedicellariæ and the less obvious ruggedness caused by the general granulation rising collar-like around the papular pores.

As in the second specimen, the actinal surface of the present example bears tubercles, which gradually flatten from the region of the mouth outwards toward the margins. Near the margins the tubercles form a polygonal flat tessellation, obscuring most of the underlying granulation.

Localities.—Great Barrier Reef, Queensland (two specimens); Ugi Island, north-east of San Cristoval, British Solomon Islands; Palm Island, near Townsville, Queensland (Austr. Mus., Regd. Nos. J. 5139; J. 4678; A. 11,679; G. 3226).

Distribution.—Amboina; Mauritius; Philippines; Viti; New Guinea; Samoa; Sumatra; Queensland.

CULCITA NOVAEGUINEAE VAR. *ARENOSA*.

- Culcita arenosa* Perrier, Recherches sur les Pedicell., 1869, 66, pl. ii., fig. 6.
Culcita arenosa Perrier, Rev. Stell. Mus. d'Hist. Nat. Paris, 1875, 264.
Culcita arenosa Hartlaub, Notes Leyden Museum, xiv., 1892, 92.
Culcita novae-guineae var. *arenosa* Döderlein (in Semon) Zool. Forschung. in Austr. and dem Malay Archip., v. (Jena Denkschr., viii.), 1896, 315, pl. xix., figs. 5-6.
Culcita novae-guineae var. *arenosa* Bedford, Proc. Zool. Soc. London, 1900, 296.
Culcita novae-guineae var. *arenosa* Goto, Journ. Coll. Sci. Tokyo, xxix., 1914, 517.
Culcita novaeguineae Forma *arenosa* Fisher, Bernice P. Bishop Museum, Bull., 27, 1925, 71, pl. vi.

(Pl. xv., fig. 1; pl. xvi., fig. 5; pl. xvii., fig. 6.)

In the single specimen available R. = approximately 86 mm. It was collected at Port Moresby, Papua, and agrees perfectly with Döderlein's Fig. 5 on pl. xix. of the abactinal surface. Judging by the description given by Bedford, the present specimen resembles the one examined by him. Although a few isolated conical spinelets occur on the abactinal surface of the specimen, it lacks the small well-spaced spinelets described and figured by Fisher and set out in Goto's key as occurring on the poriferous areas. These facts point to the conclusion that two phases of *arenosa* are in existence—one with an almost smooth abactinal surface as figured by Döderlein and referred to herein, and one well spinulated as figured by Fisher. Whether the differences are of any significance is a question to be answered when more material is available for examination. In the meantime, it is best to accept the two phases as belonging to the one variety.

The present specimen is roundly pentagonal, with a conspicuously domed abactinal surface. The papular areas merge, but in isolated cases they may be bordered on one or two sides by thin, line-like, non-poriferous patches. Except for a few small conical spinelets, almost unnoticeable, the poriferous areas are relatively smooth. The granulation surrounding the actual papular pores is depressed and even, not conspicuously raised collar-like, as seen in other varieties.

The non-poriferous patches, which are generally irregularly shaped, flattened, and finely granulated, are provided with a few (1 to 16, usually 1-6) bluntly pointed or entirely rounded spinelets of comparatively conspicuous size. Pedicellariæ do not occur.

Actually the specimen is almost inseparable from a specimen of var. *plana* with flattened tubercles.

Locality.—Port Moresby, Papua (Austr. Mus., Regd. No. G. 11,336).

Distribution.—Hawaiian Islands (Sandwich Islands); Amboina; Singapore; Ceram Laut; Papua.

CULCITA GREX.

- Culcita grex* Müller and Troschel, Syst. der Asteriden, 1842, 39.
Culcita grex Perrier, Rev. Stell. Mus. d'Hist. Nat. Paris, 1875, 260.
? *Culcita grex* Bell, Proc. Zool. Soc. London, 1887, 140, 142.
Culcita grex Hartlaub, Notes Leyden Museum, xiv., 1892, 87, pls. i.-ii.
Culcita grex de Loriol, Rev. Suisse Zool., 1, 1893, 382.
Culcita grex Döderlein (in Semon) Zool. Forschungsr. in Austr. und dem Malay Archip., v. (Jena Denkschr., viii.), 1896, 316.

Culcita grex Bell, Proc. Zool. Soc. London, 1898, 849.

Culcita grex Goto, Journ. Coll. Sci. Tokyo, xxix., 1914, 517.

(Pl. xiv., fig. 6; pl. xvi., fig. 1; pl. xvii., fig. 3.)

Five specimens, all approximately the same size (R. = 115 mm.), are before me. They agree with existing descriptions and keys, and so well with Hartlaub's excellent figures that no doubt is entertained as to the identity of the specimens. Judging from the present series the species is constant in form, exhibiting no variation, thus making it an easily recognisable *Culcita*.

Having been in Vanikoro, Santa Cruz Group, at the time the above specimens were collected, I am able to give some information regarding the life colours and habits of the species. *Culcita grex* was not found between tide marks. It seemed to prefer the quieter waters outside the fringing coral reefs, where it occurred in abundance in a depth of about four fathoms on beds of sand and loose dead coral. When brought to the surface by divers, examples were seen to be of considerable size, often measuring fourteen inches and more in diameter, and bloated and swollen with water to an amazing degree. When they were taken from the water and placed on the deck of a vessel the water oozed quickly from the mouth, leaving the body flat and limp. From some individuals a small commensal fish (*Carapus homei*) emerged from the stomach along with the ejected water. An earlier note concerning this case of commensalism was accompanied by a figure (5), but through an error specimens of *Culcita schmideliana* var. *ajricana* were photographed in association with the fish, instead of the specimens of *Culcita grex* before me.

In life the non-poriferous areas, the small spinelets, and the underlying granulation are of a deep yellow brown hue.

The papular areas are darker, owing to the deep brown of the papular pores. The actinal surface, like the greater part of the abactinal surface, is deep yellow-brown in colour. Drying after preservation in alcohol causes the colours to fade and become paler almost to a biscuit shade.

Dried specimens are roundly pentagonal in shape with both surfaces perfectly flat. The species seems to lack the sturdy skeletal structure of its allies, and is more prone to total collapse when taken from the water. The non-poriferous areas are well defined, destitute of large conical spinelets, and clothed only in a very fine granulation. This granulation is, in the main, dense and made up of vast numbers of minute, sharply pointed, elongate, and delicate spinelets. The non-poriferous areas vary in size, but are always sufficiently well developed to isolate the papular areas.

The papular areas are roughly round in outline. They possess several medium-sized spinelets, some of which are conical and some blunt and rounded. The granulation is sparse and of the same character as that seen on the non-poriferous areas. A definite and abrupt line separates the two surfaces.

The tubercles and the underlying granulation on the actinal surface are weakly developed and furnish a striking contrast when compared with other representatives of the genus. Although the tubercles are abundant they rise very little above the general granulation and are always only

(5) Troughton and Livingstone, Austr. Mus. Magazine, iii., No. 4, 1927, 120.

slightly rounded. The granulation is fine and separates the tubercles much as in other species of *Culcita*.

Locality.—Three to four fathoms off the mouth of Sunday River, Vanikoro Island, Santa Cruz Group, August, 1926 (Austr. Mus., Regd. No. J. 5106).

Distribution.—? Andaman Islands; Bay of Amboina; Funafuti and Rotuma, Ellice Group; Moluccas; Vanikoro, Santa Cruz Group.

EXPLANATION OF PLATES.

Plate xiv.

- Fig. 1. *Culcita novaeguineae* var. *plana* Hartlaub. Portion of abactinal surface of specimen from the Great Barrier Reef, Queensland (Austr. Mus., Regd. No. J. 5139). Half natural size.
- Fig. 2. *Culcita novaeguineae* var. *plana* Hartlaub. Portion of abactinal surface of specimen from Palm Island, Queensland (Austr. Mus., Regd. No. G. 3226). Slightly over half natural size.
- Fig. 3. *Culcita novaeguineae* var. *plana* Hartlaub. Portion of abactinal surface of specimen from the Great Barrier Reef, Queensland (Austr. Mus., Regd. No. J. 4678). Two-thirds natural size.
- Fig. 4. *Culcita novaeguineae* var. *plana* Hartlaub. Portion of abactinal surface of specimen from Ugi, British Solomon Islands (Austr. Mus., Regd. No. A. 11,679). About two-thirds natural size.
- Fig. 5. *Culcita novaeguineae* var. *acutispinosa* Bell. Portion of abactinal surface of specimen from Ysabel Island, British Solomon Islands (Austr. Mus., Regd. No. J. 4732). About two-thirds natural size.
- Fig. 6. *Culcita grex* Müller and Troschel. Portion of abactinal surface of specimen from Vanikoro, Santa Cruz Group (Austr. Mus., Regd. No. J. 5106). About two-thirds natural size.

Plate xv.

- Fig. 1. *Culcita novaeguineae* var. *arenosa* Perrier. Portion of abactinal surface of specimen from Port Moresby, Papua (Austr. Mus., Regd. No. G. 11,336). Three fourths natural size.
- Fig. 2. *Culcita novaeguineae* var. *typica-acutispinosa* Döderlein. Portion of abactinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3169). About two-thirds natural size.
- Fig. 3. *Culcita novaeguineae* var. *typica* Müller and Troschel. Portion of abactinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3170). Slightly over half natural size.

Plate xvi.

- Fig. 1. *Culcita grex* Müller and Troschel. Portion of actinal surface of specimen from Vanikoro, Santa Cruz Group (Austr. Mus., Regd. No. J. 5106). Natural size.
- Fig. 2. *Culcita novaeguineae* var. *typica-acutispinosa* Döderlein. Portion of actinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3169). Natural size.
- Fig. 3. *Culcita novaeguineae* var. *acutispinosa* Bell. Portion of actinal surface of specimen from Ysabel Island, British Solomon Islands (Austr. Mus., Regd. No. J. 4732). Natural size.

- Fig. 4. *Calcita novaeguineae* var. *plana* Hartlaub. Portion of actinal surface of specimen from Great Barrier Reef, Queensland (Austr. Mus., Regd. No. J. 5139). Slightly under natural size.
- Fig. 5. *Calcita novaeguineae* var. *arenosa* Perrier. Portion of actinal surface of specimen from Port Moresby, Papua (Austr. Mus., Regd. No. G. 11,336). Slightly under natural size.
- Fig. 6. *Calcita novaeguineae* var. *typica* Müller and Troschel. Portion of actinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3170). Slightly under natural size.

Plate xvii.

- Fig. 1. *Calcita novaeguineae* var. *typica-acutispinosa* Döderlein. Enlarged section of abactinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3169). X 3.
- Fig. 2. *Calcita novaeguineae* var. *plana* Hartlaub. Enlarged section of abactinal surface of specimen from Great Barrier Reef, Queensland (Austr. Mus., Regd. No. J. 5139). X 3.
- Fig. 3. *Calcita grex* Müller and Troschel. Enlarged section of abactinal surface of specimen from Vanikoro, Santa Cruz Group (Austr. Mus., Regd. No. J. 5106). X 2.5.
- Fig. 4. *Calcita novaeguineae* var. *typica* Müller and Troschel. Enlarged section of abactinal surface of specimen from Southwest Bay, Malekula, New Hebrides (Austr. Mus., Regd. No. J. 3170). X 3.
- Fig. 5. *Calcita novaeguineae* var. *acutispinosa* Bell. Enlarged section of abactinal surface of specimen from Ysabel Island, British Solomon Islands (Austr. Mus., Regd. No. J. 4732). X 2.
- Fig. 6. *Calcita novaeguineae* var. *arenosa* Perrier. Enlarged section of abactinal surface of specimen from Port Moresby, Papua (Austr. Mus., Regd. No. G. 11,336). X 2.

A NEW SPECIES OF *FROGGATTIMYIA* TOWNSEND.

Family TACHINIDÆ (Diptera).

By J. R. MALLOCH.

FROGGATTIMYIA *ANGULIVENTRIS*, n.sp.

Male and female.—Head black, interfrontalia reddish but obscured by the grey dust, the parafacials and jowls reddish to brownish testaceous, slightly shining, but quite densely grey dusted; antennae black, the extreme apex of second and but a narrow line at base of third segment reddish; palpi testaceous yellow. Hairs and bristles black, the occipital hairs white, postocular cilia dark. Thorax and abdomen black, slightly shining, with rather dense grey dust, the abdomen in the male with the sides of first and second visible segments usually rather distinctly red. Mesonotum with four black vittae; apex of scutellum reddish; all hairs and bristles dark. Legs black. Wings greyish hyaline. Squamae white, the margin yellow. Halteres dark brown to fuscous.

Frons of male about one-sixth of the head width at vertex, widened to anterior extremity, with two strong verticals, no developed postverticals nor ocellars, one or two recurved upper orbitals and a series of inner marginal incurved bristles on each orbit which diverge below base of antennae